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ABSTRACT

This report, based on findings of recent studies on the use of anabolic steroids in the United States, was written to educate the public about these drugs and the dangers of misusing them. It notes that the nonmedical use of anabolic/androgenic steroids among adolescents and young adults is of growing concern, with possibly as many as half a million Americans under age 18 abusing these drugs to improve their athletic performance, appearance, and self-image. Evidence is presented suggesting that medically unsupervised steroid use may pose severe risks to physical and psychological health. One section describes valid medical uses of anabolic steroids, explains what anabolic steroids are, and examines if they really work. Other sections focus on a brief history of steroid use, abuse of anabolic steroids, and megadosing. A section on health hazards highlights dangers specific to men, specific to women, and common to both sexes. Special dangers to adolescents are discussed, the threat of Acquired Immune Deficiency Syndrome through needle sharing is explained, and possible psychological effects of steroid use are considered. Questions are posed about the possible addictiveness of steroids, steroids on the black market are described, and safe and healthy alternatives to steroid use are suggested. Four methods of combating the nonmedical use of anabolic steroids are recommended: testing, treatment, legislation, and education. The report concludes with a list of relevant resources. (NB)

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Summary

The nonmedical use of anabolic/androgenic steroids among adolescents and young adults is of growing concern. As many as half a million Americans under age 18 may be abusing these drugs to improve athletic performance, appearance and self-image. Yet a growing body of evidence suggests that medically unsupervised steroids use may pose severe risks to physical and psychological health.

This **Research Report** *is based on the findings of recent studies on the use of anabolic steroids in the United States. Its goal is to educate the public about these drugs and the dangers of misusing them.*

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ANABOLIC STEROIDS

A Threat to Body and Mind

THE PRICE OF PERFECTION

Shock waves went through the sports world when Canadian track superstar Ben Johnson was denied his gold medal at the 1988 Olympics after tests showed he had taken anabolic steroids. The incident called international attention to the use of anabolic steroids among world-class athletes to gain competitive advantage.

Still, athletes and nonathletes alike persist in taking them. Teenagers are taking anabolic steroids not just to excel in sports but to enhance their self-images by perfecting their physiques. There are even reports of male adults in physically demanding professions like law enforcement using them to appear tougher and more formidable.

As the drug grows in popularity so does awareness of the serious side effects it may cause. One of the most alarming is the threat of AIDS. HIV—human immunodeficiency virus—can be transmitted if shared needles are used to inject the drug.

U.S. Department of Health and Human Services • Public Health Service • Alcohol, Drug Abuse, and Mental Health Administration

But potential harm to physical and psychological health is only one aspect of this troubling trend.

A Question of Values

The nonmedical use of anabolic steroids raises more ethcial and moral issues. Engaging in steroids use is illegal. Users are likely to find themselves acquiring these drugs through illicit—and expensive—channels. The heavy demand for anabolic steroids has given rise to a black market, with sales estimated at as much as $400 million a year. Moreover, supplies, which are often illegally manufactured and do not meet established standards, may be contaminated.

Athletes who use these drugs are cheating. They gain an unfair advantage over opponents and violate the ban on steroids imposed by most major sports organizations.

Another Addictive Substance?

Can anabolic steroids be added to the list of addictive drugs? Early signs point to addictive patterns among users. At the very least, users demonstrate an unwillingness to give up anabolic steroids even in the face of possibly dire consequences to their health.

Stopping the Trend

As the health risks of anabolic steroids become more apparent, efforts to curtail their use—through education, legislation, and medical practices—are intensifying.

For those already hooked, kicking the steroids habit is the best chance to escape devastating side effects. For potential users, the solution, of course, is to never take the drug at all. There are other ways to be a winner athletically and socially without harming health and without cheating.

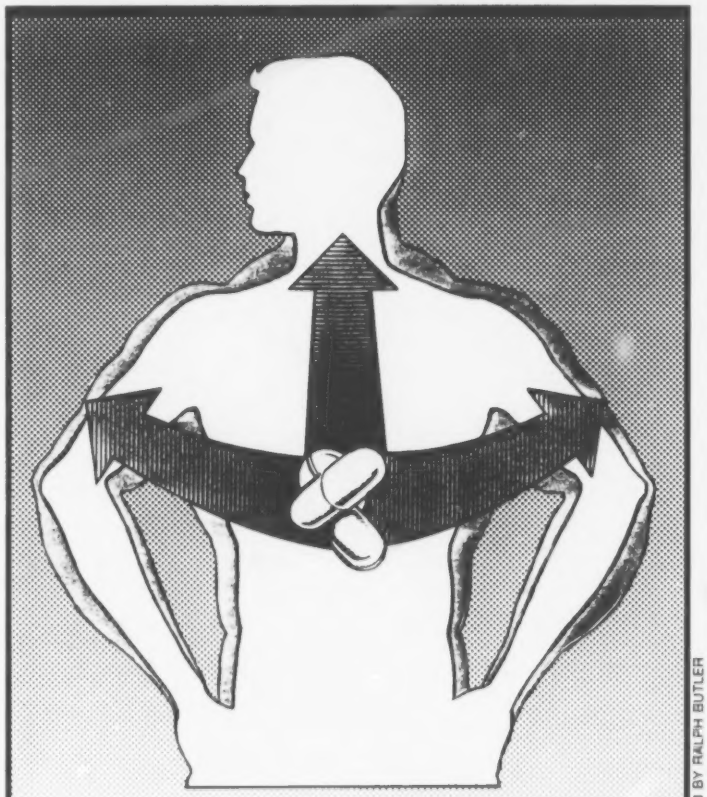

ILLUSTRATION BY RALPH BUTLER

In certain cases, some anabolic steroids may have therapeutic value.

"I daydreamed about walking down the hall in short shorts, a tank top and a great tan."
—Mark, 15

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USING ANABOLIC STEROIDS

Valid Medical Uses

Steroids are drugs derived from hormones. Anabolic steroids comprise one group of these hormonal drugs. In certain cases, some may have therapeutic value.

The U.S. Food and Drug Administration has approved the use of selected anabolic steroids for treating specific types of anemia, some breast cancers, osteoporosis, endometriosis, and hereditary angioedema, a rare disease involving the swelling of some parts of the body.

Some medical specialists believe that anabolic steroids can improve the appetite and improve healing after surgery, but the FDA has withdrawn approval for such uses since the claims are vague and largely unsubstantiated.

What Are Anabolic Steroids?

Anabolic steroids—or more precisely, anabolic/androgenic steroids—belong to a group known as ergogenic,

or so-called "performance-enhancing," drugs. They are synthetic derivatives of testosterone, a natural male hormone.

"Anabolic" means growing or building. "Androgenic" means "masculinizing" or generating male sexual characteristics.

Most healthy males produce between 2 and 10 milligrams of testosterone a day. (Females do produce some testosterone, but in trace amounts.) The hormone's anabolic effects help the body retain dietary protein, thus aiding growth of muscles, bones, and skin.

The androgenic characteristics of testosterone are associated with masculinity. They foster the maturing of the male reproductive system in puberty, the growth of body hair and the deepening of the voice. They can affect aggressiveness and sex drive.

Do They Really Work?

Anabolic steroids are designed to mimic the bodybuilding traits of testosterone while minimizing its "masculinizing" effects. There are several types, with various combinations of anabolic and androgenic properties. The International Olympics Committee to date has placed 17 anabolic steroids and related compounds on its banned list.

Athletes who have used anabolic steroids—as well as some coaches, trainers, and physicians—do report significant increases in lean muscle mass, strength, and endurance. But *no* studies show that the substances enhance performance.

Anabolic steroids do not improve agility, skill or cardiovascular capacity. Some athletes insist that these substances aid in recovery from injuries, but no hard data exists to support the claim.

"There is little compelling scientific evidence to support the concept that steroids enhance athletic performance."
—Theodore J. Cicero, Ph.D., and Lynn H. O'Connor, Ph.D., 1990

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"I wanted to be the best swimmer and black female athlete ever."
—Grace, 17

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"Athletes would rather confess to cocaine use than to steroids use."
—Dr. Charles E. Yesalis, Pennsylvania State University

SPORTS ORGANIZATIONS OUTLAWING ANABOLIC STEROIDS

The International Olympics Committee banned steroids use by all athletes in its member associations in 1975. Since then most major amateur and professional organizations have put the drugs on their list of banned substances. They include:

National Football League
National Collegiate Athletic Association
International Amateur Athletic Federation
International Federation of Body Builders

A BRIEF HISTORY

Winning Through Doping

The drive to compete—and to win—is as old as humankind. Throughout history, athletes have sought foods and potions to transform their bodies into powerful, well-tuned machines.

Greek wrestlers ate huge quantities of meat to build muscle, and Norse warriors—the Berserkers—ate hallucinogenic mushrooms to gear up for battle.

The first competitive athletes believed to be charged with "doping"—taking drugs and other nonfood substances to improve performance—were swimmers in Amsterdam in the 1860s. Doping, with anything from strychnine and caffeine to cocaine and heroin, spread to other sports over the next several decades.

Enter Anabolic Steroids

The use of anabolic steroids by athletes is relatively new. Testosterone was first synthesized in the 1930's and was introduced into the sporting arena in the 1940's and 1950's. When the Russian weightlifting team—thanks, in part, to synthetic testosterone—walked off with a pile of medals at the 1952 Olympics, an American physician determined that U.S. competitors should have the same advantage.

By 1958 a U.S. pharmaceutical firm had developed anabolic steroids. Although the physician soon realized the drug had unwanted side effects, it was too late to halt its spread into the sports world.

Early users were mainly bodybuilders, weightlifters, football players, and discus, shot put, or javelin throwers—competitors who relied heavily on bulk and strength.

"There may be a greater number of cases of anabolic steroid-induced psychiatric illness in this country than had been assumed... these effects may pose a danger not only to the steroids user but to the public at large."
—David Katz and Harrison Pope, Harvard University

THE POSITION OF THE MEDICAL COMMUNITY

The American Medical Association condemns the use of anabolic steroids by athletes. Other medical associations have joined with the AMA in deploring steroids abuse, including the:

- American Academy of Pediatrics
- American College of Sports Medicine
- American Osteopathic Academy of Sports Medicine

During the 1970's demand grew as athletes in other sports sought the competitive edge that anabolic steroids seemed to provide.

By the 1980's, as nonathletes also discovered the body-enhancing properties of steroids, a black market began to flourish for the illegal production and sale of the drugs for nonmedical purposes.

ABUSING ANABOLIC STEROIDS

Who Takes Them—and Why?

Today it is not only the college football player or the professional weightlifter or the marathon runner who may use anabolic steroids.

It may be an 18-year-old who loathes his skinny body. Or a 15-year-old in a hurry to reach maturity.

Or a policeman who wants more muscle power on the job.

And the use of anabolic steroids is not confined to males. Professional and amateur female athletes—track and field competitors, swimmers, bodybuilders—feel the pressure to triumph, too.

Increasing numbers of adolescents are turning to steroids for cosmetic reasons. In a 1986 survey, as many as 45 percent of 200 high school users cited appearance as a primary reason for taking steroids.

Young people who use steroids defy easy categorizing. They come from cities and rural areas, from poor families and wealthy ones. They are of all races and nationalities. The common link among them is the desire to look, perform and feel better—at almost any cost. Users—and especially the young—are apt to ignore or deny warnings about health risks. If they see friends growing taller and stronger on steroids, they want the

same benefits. They want to believe in the power of the drug.

How Prevalent is Use?

Surveys and anecdotal evidence indicate that the rate of nonmedical steroids use may be increasing.

In 1990, a NIDA survey of high school seniors showed that nearly 3 percent—5 percent of males and 0.5 percent of females—reported using steroids at some time in their lives.

The same survey showed that steroids were used within the last year by nearly as many students as crack cocaine and by more students than the hallucinogenic drug PCP.

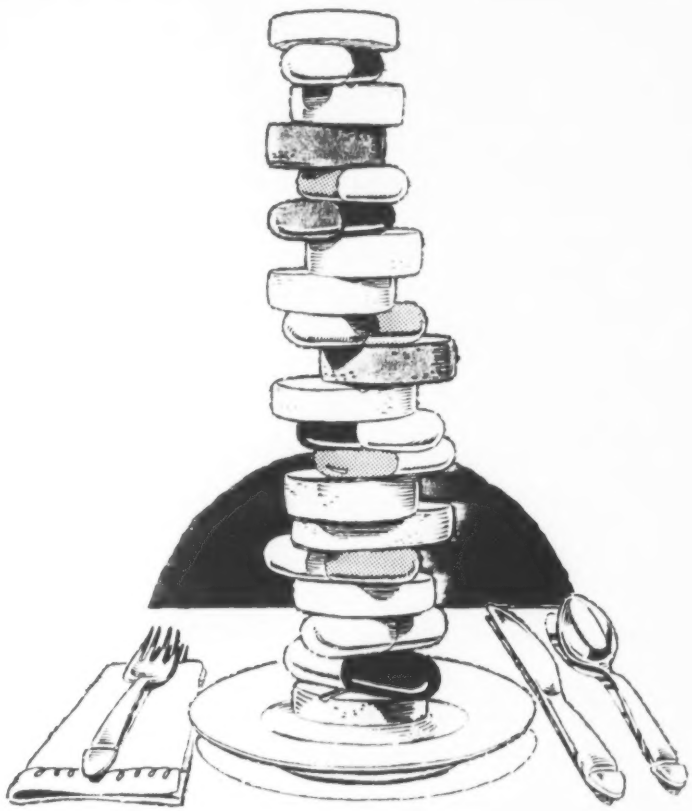
Use among college females appears to have increased somewhat. A study of 11 universities in 1984 found that steroids users were reported in only one women's sport—swimming—at a rate of 1 percent. In a follow-up survey in 1988, 1 percent of women in track and field and basketball also reported taking steroids.

Use among adult or professional athletes has not been well documented, although anecdotal evidence clearly supports the suggestion that anabolic steroids have enjoyed popularity among football players, weightlifters, wrestlers, and track and field competitors, among others.

MEGADOSING

Anabolic steroids are usually taken in pill form. Some that cannot be absorbed orally are taken by injection. The normal prescribed daily dose for medical purposes usually averages between 1 and 5 milligrams.

Some athletes, on the other hand, may take up to hundreds of milligrams a day, far exceeding medically recommended dosages.



A GLOSSARY OF TERMS

Drug and steroids use in sports has spawned a glossary of its own:

Blending. Mixing different drugs.

Bulking up. Increasing muscle mass through steroids.

Cycling. Taking multiple doses of steroids over a specified period of time, stopping for a time and starting again.

Doping. Using drugs and other nonfood substances to improve athletic performance and prowess.

Ergogenic drugs. Performance-enhancing substances.

Megadosing. Taking massive amounts of steroids, by injection or pill.

Plateauing. When a drug becomes ineffective at a certain level.

Roid rages. Uncontrolled outbursts of anger, frustration or combativeness that may result from using anabolic steroids.

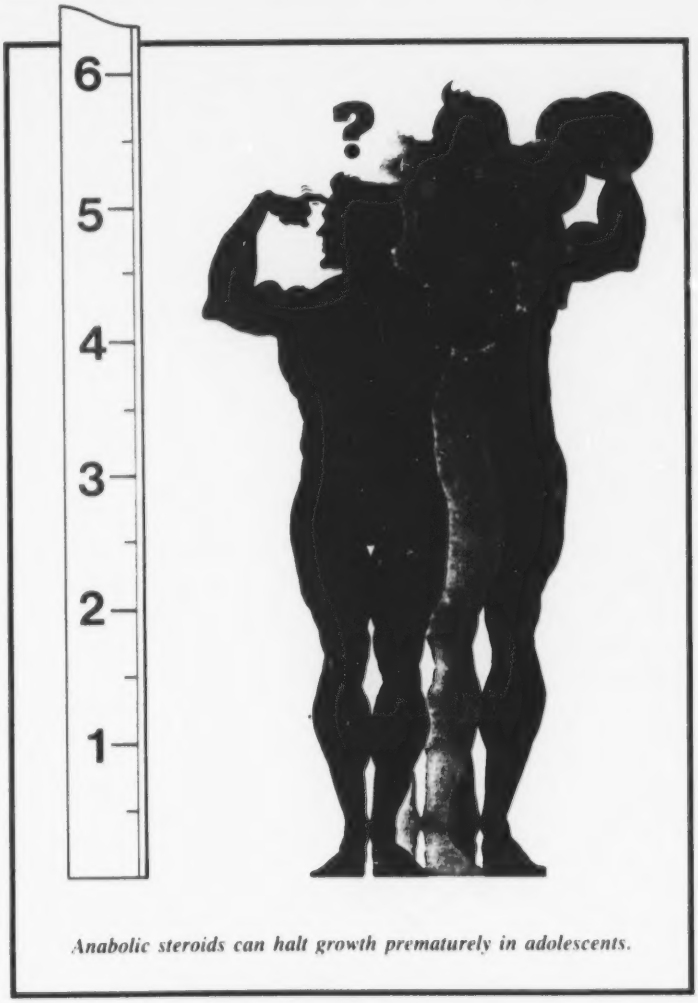
Shotgunning. Taking steroids on a hit-or-miss basis.

Stacking. Using a combination of anabolic steroids, often in combination with other drugs.

Tapering. Slowly decreasing steroids intake.

Operating on the erroneous more-is-better theory, some athletes indulge in a practice known as "stacking." They take many types of steroids, sometimes in combination with other drugs such as stimulants, depressants, pain killers, anti-inflammatories, and other hormones.

Many users "cycle," taking the drugs for 6 to 12 weeks or more, stopping for several weeks and then starting another cycle. They may do this in the belief that by scheduling their steroids intake, they can manipulate test results and escape detection. It is not uncommon for athletes to cycle over a period of months or even years.



Anabolic steroids can halt growth prematurely in adolescents.

HEALTH HAZARDS

Raising a Red Flag

Although controlled studies on the long-term outcome of megadosing with anabolic steroids have not been conducted, extensive research on prescribed doses for medical use has documented the potential side effects of the drug, even when taken in small doses. Moreover, reports by athletes, and observations of attending physicians, parents, and coaches do offer substantial evidence of dangerous side effects.

Some effects, such as rapid weight gain, are easy to see. Some take place internally and may not be evident until it is too late. Some are irreversible.

"I was more aggressive, but is aggressiveness bad?"
—Tony, former steroids user

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The Dangers

. . . to Men

Males who take large doses of anabolic steroids typically experience changes in sexual characteristics. Although derived from a male sex hormone, the drug can trigger a mechanism in the body that can actually shut down the healthy functioning of the male reproductive system. Some possible side effects:

- Shrinking of the testicles
- Reduced sperm count
- Impotence
- Baldness
- Difficulty or pain in urinating
- Development of breasts
- Enlarged prostate

. . . and to Women

Females may experience "masculinization" as well as other problems:

- Growth of facial hair
- Changes in or cessation of the menstrual cycle
- Enlargement of the clitoris
- Deepened voice
- Breast reduction

. . . and to Both Sexes

For both males and females, continued use of anabolic steroids may lead to health conditions ranging from merely irritating to life-threatening. Some effects are:

- Acne
- Jaundice
- Trembling
- Swelling of feet or ankles
- Bad breath

- Reduction in HDL, the "good" cholesterol
- High blood pressure
- Liver damage and cancers
- Aching joints
- Increased chance of injury to tendons, ligaments, and muscles

Special Dangers to Adolescents

Anabolic steroids can halt growth prematurely in adolescents. Because even small doses can irreversibly affect growth, steroids are rarely prescribed for children and young adults, and only for the severely ill.

The Office of the Inspector General in the U.S. Department of Health and Human Services has gathered anecdotal evidence that preteens and teens taking steroids may be at risk for developing a dependence on the drugs and on other substances as well.

The Threat of AIDS

People sometimes take injections of anabolic steroids to augment oral dosages, using large-gauge, reusable needles normally obtained through the black market. If needles are shared, users run the risk of transmitting or contracting the HIV infection that can lead to AIDS.

The Psychological Effects

Scientists are just beginning to investigate the impact of anabolic steroids on the mind and behavior. Many athletes report "feeling good" about themselves while on a steroids regimen. The downside, according to Harvard researchers, is wide mood swings ranging from periods of violent, even homicidal, episodes known as "roid rages" to bouts of depression when the drugs are stopped.

The Harvard study also noted that anabolic steroids users may suffer

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"If needles are shared, steroids users run the risk of transmitting or contracting the HIV infection that can lead to AIDS."

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from paranoid jealousy, extreme irritability, delusions, and impaired judgment stemming from feelings of invincibility.

ARE ANABOLIC STEROIDS ADDICTIVE?

Evidence that megadoses of anabolic steroids can affect the brain and produce mental changes in users poses serious questions about possible addiction to the drugs.

While investigations continue, researchers at Yale University have found that long-term steroids users do experience many of the characteristics of classic addiction: cravings, difficulty in ceasing steroids use and withdrawal symptoms.

Pennsylvania State University researchers studied a group of high school seniors who had developed a psychological, if not physical, dependence on anabolic steroids. Adolescent users exhibit a prime trait of addicts—denial. They tend to overlook or simply ignore the physical dangers and moral implications of taking illegal substances.

Certain delusional behavior that is characteristic of addiction can occur. Some athletes who "bulk up" on anabolic steroids are unaware of body changes that are obvious to others, experiencing what is sometimes called reverse anorexia.

SUPPLY AND DEMAND: THE BLACK MARKET

Many users maintain their habit with anabolic steroids acquired through a highly organized black market handling up to $400 million worth of the drugs a year.

Until recently most underground steroids were legitimately manufactured pharmaceuticals that were diverted to the black market through theft and fraudulent prescriptions. More effective law enforcement coupled with greater demand forced black marketers to seek new sources.

Now black-market anabolic steroids are either made overseas and smuggled into the United States or are produced in clandestine laboratories in this country. These counterfeit drugs may present greater health risks because they are manufactured without controls and thus may be impure, mislabeled, or simply bogus.

Sales are made in gyms, health clubs, on campuses, and through the mail. Users report that suppliers may be drug dealers or they may be trainers, physicians, pharmacists, or friends.

It's not hard for users to buy the drugs or to learn how to use them. Many of them rely on an underground manual, a "bible" on steroids that circulates around the country.

SAFE—AND HEALTHY—ALTERNATIVES

Anabolic steroids may have a reputation for turning a wimp into a winner or a runt into a hulk, but the truth is that it takes a lot more to be a star athlete.

Athletic prowess depends not only on strength and endurance, but on skill and mental acuity. It also depends on diet, rest, overall mental and physical health, and genes. Ath-

letic excellence can be, and is, achieved by millions without reliance on dangerous drugs.

FIGHTING BACK

Testing

The major national and international sports associations enforce their ban against anabolic steroids by periodic testing. Testing, however, is controversial.

Some observers say the tests are not reliable, and even the International Olympic Committees tests, considered to be the most accurate, have been challenged. Athletes can manipulate results with "masking agents" to prevent detection, or they can take anabolic steroids that have calculable detection periods.

Despite the problems, testing remains an important way of monitoring and controlling the abuse of steroids among athletes. Efforts are underway to make testing more accurate.

Treatment

Treatment programs for steroids abusers are just now being developed as more is learned about the habit.

Medical specialists do find persuasion is an important weapon is getting the user off the drug. They attempt to present medical evidence of the damage anabolic steroids can do to the body. One specialist notes that medical tests, such as those that show a lowered sperm count, can motivate male athletes to cease usage.

One health clinic considers the anabolic steroids habit as an addiction and structures treatment around the techniques used in traditional substance abuse programs. It focuses on acute intervention and a long-term follow-up, introducing nonsteroids alternatives that that will maintain body fitness as well as self-esteem.

"We see...people not being able to see their lives falling apart, people trying to get off the drug and not being able to."
—Kenneth Kashkin and Herbert Kleber, Yale University

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For Further Information

NIDA Hotline
1-800-662-HELP

Operated by the National Institute on Drug Abuse, this is a confidential information and referral line that directs callers to drug abuse treatment centers in their local community.

NCADI
1-800-729-6686

The National Clearinghouse for Alcohol and Drug Information (NCADI) provides information on all drugs, including alcohol. Free materials on drug abuse are also available. If you wish to write NCADI, the address is P.O. Box 2345, Rockville, MD 20852.

Legislation

Both Federal and State governments have enacted laws and regulations to control anabolic steroids abuse.

In 1988, Congress passed the Anti-Drug Abuse Act, making the distribution or possession of anabolic steroids for nonmedical reasons a Federal offense. Distribution to minors is a prison offense.

In 1990, Congress toughened the laws, passing legislation that classifies anabolic steroids as a controlled substance. The new law also increases penalties for steroids use and trafficking. To halt diversion of anabolic steroids onto the black market, the law imposes strict production and recordkeeping regulations on pharmaceutical firms.

Over 25 states have passed laws and regulations to control steroids abuse, and many others are considering similar legislation.

Education

Prevention is the best solution to halting the growing abuse of anabolic steroids. The time to educate youngsters is *before* they become users.

Efforts must not stop there, however. Current users, as well as coaches, trainers, parents, and medical practitioners need to know about the hazards of anabolic steroids. The young need to understand that they are not immortal and that the drugs can harm them. An education campaign must also address the problem of covert approval by some members of the medical and athletic communities that encourages steroids use.

The message needs to be backed up by accurate information and spread by responsible, respected individuals.

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RESEARCH REPORT SERIES

Each issue of the Research Report Series will provide brief but detailed research findings on a single health issue that is of national interest. The chief purpose of the *Research Report Series* is to educate and inform the public about the dangers of substance abuse. The issues will refer to the latest scientific data and to NIDA surveys for determining trends.

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